ordering of the code words in the table, priority code words always being those code words in the table with a place in the raster, i.e. for which raster points are available. For code words in the table for which there are no further raster points, there is no choice but to insert them in the remaining free places in the bit stream. These code words are thus not priority code words in the sense of the present invention.

The number of priority code words is not determined in advance. Priority code words are written until the memory available for the coded bit stream is full, i.e. until no further priority code word can be written. The size of the memory is equal to the total number of bits previously used for the spectral data, i.e. no further bits are required by the rastering. The memory is thus limited by the number of code words to prevent the coding efficiency falling off as a result of raster ordering. All the code words could, of course, be placed on raster points to make them error tolerant. However, this would lead to a marked decrease in the coding efficiency since the free bits remaining between the raster points are not used.

The first aspect of the present invention relates to determining the priority code words, i.e. the code words which represent the spectral values which are psychoacoustically important compared with other spectral values. A psychoacoustically important spectral line is e.g. a spectral line which contains more energy than another spectral line. Generally speaking it can be said that the more energy a spectral line has the more important it is. Thus it is important that spectral lines with high energy are not disturbed and equally important that spectral lines with high energy do not result from errors.

Until now it has been assumed that the spectral lines with high energy are located primarily in the lower part of the

spectrum. This is true in many cases but not in all. The present invention ignores this assumption by using an implicit indicator to estimate the energy of the coded spectral line in a code word, or of the spectral lines if a number of spectral lines are coded in a code word.

This indicator is the code book or code table, e.g. a Huffman code table, which is used. In the AAC standard eleven tables e.g. are used. The value ranges of these tables differ considerably. The maximum absolute values of the tables 1 to 11 are as follows:

1; 1; 2; 2; 4; 4; 7; 7; 12; 12; 8191.

As a result of these different value ranges, the maximum error depends on the table. Taking account of the sign for each table, which is either explicitly available in the table or is transmitted outside the table, the maximum error amounts to twice the cited absolute value. According to the present invention the determination of the priority code words is effected on the basis of the code table which is employed, the indicator being the highest absolute value and implicitly the code table number. At first code words whose code table has the greatest value range are considered. Then follow those code words whose code table has the second greatest value, and so on. In the case of the AAC standard, therefore, table 11 is considered first, followed by tables 9 and 10 and concluding with tables 1 and 2 with the lowest priority. Priority code words, which are placed on raster points, are thus the code words in the sort table for which raster points are available.

An advantage of this method of determining the code words is the fact that no additional information has to be transmitted for the decoder since the tables which are used are transmitted in the side information and from this information the de-

coder can determine the code word sequence used during the transmission.

The second aspect of the present invention relates to the use of short (sampling) windows as opposed to long windows for transforming discrete-time samples of the audio signal into the frequency domain in order to obtain spectral values representing the audio signal. Short windows are defined in the AAC standard and also in the standard layer 3. In the case of short windows a number of short MDCTs are used instead of one long MDCT.

In the AAC standard a group of eight MDCTs each having 128 output values is used e.g. instead of an MDCT with 1024 output values. This results in an increase in the temporal resolution of the coder at the expense of the frequency resolution. Generally short windows are used for transient signals. If short windows are used with AAC for example, eight successive complete spectra, i.e. eight sets of spectral values, are obtained, each set of spectral values encompassing the whole spectrum. In contrast to the long windows, however, the distance between the spectral values is also eight times as big. This represents the diminished frequency resolution, which, however, is accompanied by a higher temporal resolution.

In the AAC standard a grouping is performed, i.e. groups are formed from the eight spectra. For each of these groups there is a set of scale factors. In the simplest case each group contains just one window. In this case eight scale factor sets must be transmitted. To achieve stronger compression, a plurality of windows is concentrated in a group in the AAC standard, generally taking account of psychoacoustic requirements. This reduces the number of scale factors to be transmitted, resulting in a better data compression. The spectral data are transmitted, i.e. written into a coded bit stream, sequen-